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either she or her ancestors must have had some idea of what was being accomplished. The point here seized upon and utilized in the development by natural selection is so different from those usually utilized. The points usually developed into permanent habits by natural selection and inheritance are, commonly occurring, easily understood laws. I, however, surely believe with Riley and others that this perfect adaptation of Yucca and *Pronuba* must be the result of natural selection, the gradual modification of some archetypal form.

However this development took place, one watching *Pronuba's* actions at the present time, so full of purpose and understanding, can hardly fail to conclude with Riley that it is not "blind instinct" alone that guides her.—H. J. WEBBER, *Shaw School of Botany.*

ZOOLOGY.

Trematodes.—All authors agree that Trematodes are provided with a superficial cuticle which is pierced by numerous minute canals, but their statements in regard to the origin of this cuticle are very contradictory. Thus Ziegler looks upon the cuticle as a metamorphosed epithelium, Schneider and Minot consider it the basal membrane of an epithelium which has been lost in the parasitic life of the worm, while Leuckart describes it as a product of the subcuticula. To these three theories Dr. Brandes, of Halle, now adds a fourth[1] of which the following is a brief resumé:

Trematodes do not possess any subcuticula in the true sense of the word; the subcuticula described by Leuckart and others is parenchymatic tissue which, together with a similar tissue found between the muscles, Brandes names ectoparenchym, to distinguish it from the endoparenchym, *i. e.*, the parenchym in which the genital organs are imbedded; *there is, however, a true cuticle present, which is a product of the subcuticular glands;* the cuticle is not pierced by canals.—C. W. STILES.

Fishes of Ohio.—Oberlin College has begun the publication of a "Laboratory Bulletin." The second number, which has just appeared, contains a "Descriptive list of the fishes of Lorain county, Ohio," by the museum assistant, Lewis M. McCormick. In all 89 species are enumerated, and *Etheostoma wrighti* is described as new.

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[1] G. Brandes, Zum feineren Bau der Trematoden, Zeitschrift f. w. Zool., 1892, Bd. liii, 4.

The paper is illustrated with 18 figures reproduced from the publications of the U. S. Fish Commission.

Necturus maculatus in the Hudson River.—In Prof. Cope's Monograph of North American Batrachia (United States National Museum Bulletin No. 34) an interesting feature of the geographical distribution of the Mud Puppy—*Necturus maculatus* Raf.—has been overlooked, viz., the fact that through the agency of canals the species has been introduced into the Hudson River and has become abundant both in the river and in its various tributaries.

Prof. Cope gives the habitat of the species as follows: "Ranges throughout the tributaries of the great lakes and the Mississippi, as well as the rivers that flow into the Gulf of Mexico and the Atlantic Ocean as far north as the Tar River, North Carolina."

Only one New York locality is cited, Grass River, St. Lawrence county. This is a tributary of the St. Lawrence River, and its source is not very far distant from the source of the Hudson. The only other locality cited which is at all near the Hudson is Burlington, Vermont. This locality also is in the drainage area of the St. Lawrence. Both the localities cited are covered by the statement "ranges throughout the tributaries of the great lakes," but there is nothing to indicate that the species inhabits the Hudson and tributaries.

De Kay, in 1842 (Natural History of the State of New York), predicted that the species would some day be found inhabiting the Hudson. De Kay's exact words on the distribution of the Mud Puppy in the State of New York were as follows: "This curious and interesting aquatic animal is common in the northern and western parts of the State. It is found in Lake Champlain, and is particularly abundant at the Falls of the Onion River and at the outlet of Lake George. It inhabits Lakes Erie, Seneca, and the other lakes in the western districts of New York. It has been found in the Erie canal, and will doubtless, ere long, be found to have reached the Hudson River." De Kay's prediction has come to be a fact. Whether the species came from the west through the Erie canal or from Lake Champlain through the Champlain canal, it is now so abundant in the neighborhood of Albany as to be somewhat of a nuisance. The city reservoirs are plentifully stocked with the species. A short time ago an individual was washed out of one of the fire-plugs in the heart of the city, and report says that another became wedged in the water pipes of one of our school-houses and had to be cut out in order to allow the water to flow.

As the Hudson and Delaware Rivers are connected by a canal which runs from Kingston on the Hudson to Port Jervis on the Delaware it is not improbable that the Mud Puppy will at some future time be found in the Delaware. At present no record of its occurrence in the Delaware is known to me, and probably it has never yet been found in that river. At least no mention of the species is made in Dr. C. C. Abbot's Catalogue of the Vertebrates of New Jersey, published in 1868, nor in Julius Nelson's revision of the same catalogue, published in 1890.

The presence of the species in the Hudson and its tributaries is worthy of note, as it is one of the very few instances in which we have apparently good evidence that the habitat of an aquatic animal has been unintentionally enlarged through human agency.

WM. B. MARSHALL, *Albany, N. Y.*

The Foot in the Amniota.—It is well-known that the Dorking fowl is the only living bird which, in the adult condition, possesses a five-toed foot. Messrs. G. B. Howes and J. P. Hill have recently studied this form and they conclude[2] that the two inner toes are the result of fission of the hallux and that the variation in number of phalanges in the supernumerary toe is caused by degree of longitudinal subdivision. The hallux metatarsal is proximally prolonged into a rod of bone running parallel with the other metatarsal and articulating upon the inner condyle of the tibio-tarsus, a reversional characteristic unknown in other living birds, through which Archæopteryx had already passed and for which we must go back to the last aberrant tetradactyle Dinosaurs. In the general portion of this paper they show that this extra toe is not to be interpreted as a reversional reappearance of a usually missing hallux but rather as a splitting of the hallux normally present. Going farther they point out that the phalangeal characters of the different classes of air-breathing vertebrates throw light upon the phylogeny. In all mammals[3] the phalangeal formula is 2, 3, 3, 3, 3, or less; that of the Sauropsida 2, 3, 4, 5, 4, or less by reduction, while that of the Amphibia is 2, 2, 3, 4, 3, or less. In no known Amphibian, living or extinct, has the second digit more than two phalanges, and hence neither the sauropsidan or the mammalian foot can be derived from that of the Amphibia except by a process of intercalation of which we have no other evidence. This in connection with Cope's discovery of the mammalian condition of the limbs in the Theramorpha is strong evidence against the derivation of the Mammalia from the Batrachia; both Mammals and Sauropsida must have come from an ancestor with the phalangeal formula 2, 3, 4, 5, 4, or more.

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[2] Jour. Anat. and Phys., xxvi, 395, 1892.

[3] Except Cetacea, where Kükenthal argues that the supernumerary phalanges are dismembered and duplicated epiphyses.

Twisting of the Umbilical Cord.—In man and many mammals the umbilical cord is twisted but the twisting may be either right or left handed and the number of turns may vary. To explain this twisting several hypotheses have been advanced, the last being that of Prof. F. J. Allen.[4] The twisting consists in the twining of the two arteries about the single vein of the cord, and this involves an increase in length of the arteries greater than that of the vein. To test this Allen devised a model of rubber tubes and cord and found that the hypothesis was fully supported by the model. It is not easy to see what is the gain to either fœtus or mother by this twisting.

General Notes—Lower Invertebrates.—Dr. R. von Lendenfeld publishes[5] a preliminary arrangement of the calcareous sponges. The work is based upon the labors of Haeckel and Poléjaeff. Twenty-one genera are recognized.

Arthropoda.—Emile Deschamps claims[6] that the recently established genus Abacola of Prof. C. L. Edwards is synonymous with Thyopsyllus of Brady.

Dr. Paul Marshal describes a hermit crab (*Pagurus striatus*) which he found inhabiting a left-handed shell of *Neptunea contraria*. The abdomen of the individual was normal and showed the same lack of symmetry as its fellows, and on trial was found to hold itself equally well in both dextral and sinistral shells.

E. A. Birge publishes[7] a list of 64 species of Cladoceran Crustacea from Madison, Wisc. *Latonopsis occidentalis* and *Alona lepida* are described as new. A new species of Moina is indicated but not described.

Vertebrates.—C. K. Averill catalogues for the Bridgeport Scientific Society 246 species of birds found in the vicinity of Bridgeport, Conn.

[4] Jour. Anat. and Phys., xxvi, 300, 1892.

[5] Stz. Akad. Wien., Bd. c. Abth. 1, p. 4, 1891.

[6] Bull. Soc. Zool. France, xvii, p. 68, 1892.

[7] Trans. Wisc. Acad. Sci., viii, 1892.